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Comparison of milk production and hygiene status between dairy cows reared at free stall and open shed housing systems in Yazd province

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Abstract

In this study, the production and reproduction performances as well as milk hygiene condition of Holstein dairy cows in open housing and free stall system in Yazd province was investigated. A number of 14 Holstein dairy herds of similar feeding and milking systems and reproduction protocols (seven open housing systems vs. seven free stall systems) were studied from Dec 2016 to Jan 2017. Each herd was grouped based on size and put in five blocks according to days in milk. In each herd, total milk production was recorded daily and monthly per cow based on milking days. Bulk tank milk sampling in sterilized pots was performed monthly to measure milk components and somatic cell count (SCC). Cow comfort indices (including the No. of lying, standing and ruminating cows along with No. of ruminations/min in houses) were recorded by an expertise. The culling rate, cows with clinical mastitis signs, manure and locomotion scores, claws and hock lesion scores and the No. of lame cows were recorded and statistically analysed. The data of reproduction along with daily and monthly milk yield, based on days in milk, were recorded too.

According to the results, the percentage of standing cows in free stall system (FS) was lower than that in open housing system, OLS (3.0 vs. 7.9) but the percentage of occupation and lying cows in FS was higher than those of OLS (respectively 72.3, 61.8 vs. 69.3, 51.7, $P < 0.05$). Percent of lame, wounded and over grown claws cows was higher in OLS (respectively 5.00, 2.20, 3.98 vs. 6.92, 3.48, 5.83; $P < 0.05$). Average milk production in FS was approximately 2.5 times higher than OLS ($P < 0.05$). Body cleanliness score in FS was lower than that of OLS whereas the udder score was higher (respectively 1.70, 1.67 vs. 2.71, 1.41; $P < 0.05$). Additionally, SCC in summer time was statistically lower in FS (135.1 vs. 178.7; $P < 0.05$). Culling at first 60 days from calving along with yearly culling rate was lower in FS (respectively 15.48, 31.1 vs. 25.80, 38.7; $P < 0.05$). Higher cow conception rate and lower days to first service were exhibited

in FS compared to those than in OLS (respectively 8.51, 69.50 vs. 8.45, 83.71; $P < 0.05$). At 120 days from calving, the serum concentrations of Non S^{terified} Fatty A^{cids} (NEFA) and β -H^{ydroxy} B^{utyric} A^{cid} (BHBA) in OLS were higher than those of FS (respectively 991.3, 911.3 vs. 845.1, 843.2; $P < 0.05$).

According to the overall findings of present study, we suggest the farmers substitute open housing systems with free stall barns in Yazd province.

Keywords: Open housing, free stall systems, production performance, milk hygiene, cow comfort, Holstein cows